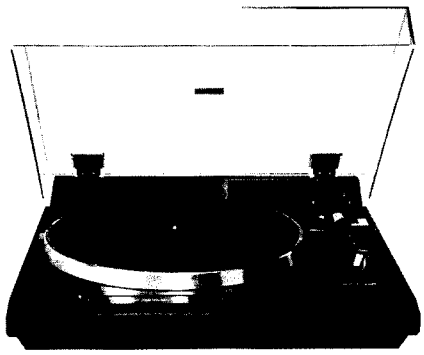
PIONEER

Service Manual

CIRCUIT & MECHANISM DESCRIPTIONS
REPAIR & ADJUSTMENTS



ORDER NO.
ARP 1117-0

STEREO TURNTABLE

PL-670(BK)

MODEL PL-670 (BK) COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Applicable model PL-670 (BK)	Power requirement	Destination
KU	○	AC 120V only	U.S.A.
KC	○	AC 120V only	Canada
KUT	○	AC120V only	U.S.A. (Without cartridge)
KCT	○	AC 120V only	Canada (Without cartridge)
R	○	AC110V – 120V, 220V – 240V (switchable)	General export
R/G	○	AC110V – 120V, 220V – 240V (switchable)	U.S. Military

- **This service manual is applicable to the PL-670 (BK)/KU, KC, R and R/G types.**
- **As to the KC, R and R/G types, please refer to pages 29.**
- **As to the other types, please refer to the additional service manual.**
- **Ce manuel d'instruction se refère au mode de réglage en français.**
- **Este manual de servicio trata del método ajuste escrito en español.**

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1. SPECIFICATIONS

PHONOGRAPH MOTOR AND PLATTER

Motor type.....DC servo motor
Drive system.....Direct drive system
Speed of rotation.....2 speeds: 33-1/3, 45 rpm
Wow and Flutter.....Less then *0.012% (WRMS)
0.025% (WRMS)
±0.035% WTD Peak (DIN)
Values marked with an "*" designate the wow and flutter for the motor, and do not include the cartridge or tonearm load.
S/N ratio.....78 dB (DIN-B)
Platter.....Diameter 304 mm, aluminium die cast

TONE ARM

Type.....Integrated straight tone arm
Effective arm length.....221 mm

SUPPLIED CARTRIDGE (PC-295T)

Type.....MM type
Replacement stylus.....PN-295T
Stylus.....0.6 mil diamond
Output voltage.....2.6 mV (1 kHz, 5 cm/s LAT Peak)
Suitable stylus pressure.....1 - 1.5 g (optimum value 1.25 g)
Frequency response.....10 Hz - 30,000 Hz
Load resistance.....50 kΩ
Weight.....6 g

FUNCTIONS PROVIDED

Auto lead-in, auto return, auto cut, arm elevation, manual play, quick play, free stop hinges.

POWER SUPPLY, OTHER

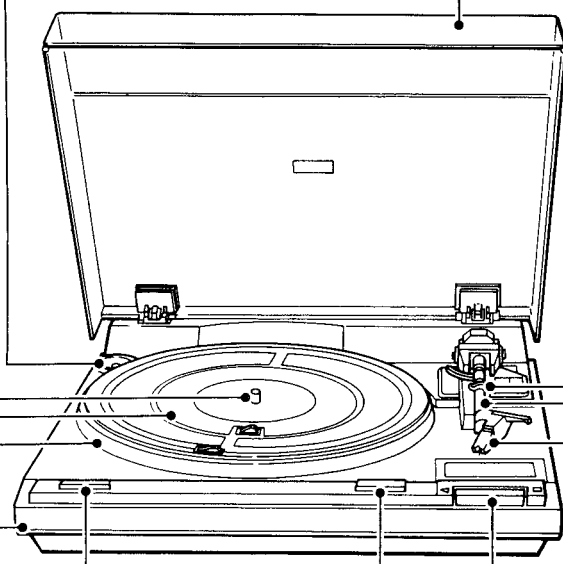
Power requirements
European, U.K., Australian models.....AC 220 V — 240 V ~, 50/60 Hz
U.S., Canadian models.....AC 120 V, 60 Hz
Other destination models.....AC 110 V — 120 V/220 V — 240 V ~ (switchable), 50/60 Hz
Power consumption
European, U.K., Australian models.....9 W
U.S., Canadian models.....9 W
Other destination models.....5 W
External dimensions....420(W) x 118(H) x 365(D) mm
16 - 1/2(W) x 4-5/8(H) x 14-3/8(D) in
Net weight.....4.7 kg (10 lb 6 oz)

SUPPLIED ACCESSORIES

EP adaptor.....1
Operating instructions.....1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

2. PANEL FACILITIES



EP Adaptor
When playing a record with a doughnut hole, place this over the platter spindle.

Dust Cover

Platter Spindle

Platter Mat

Platter

Cabinet

Arm rest

Tone Arm

Cartridge (PC-2951

Only models supplied with cartridge

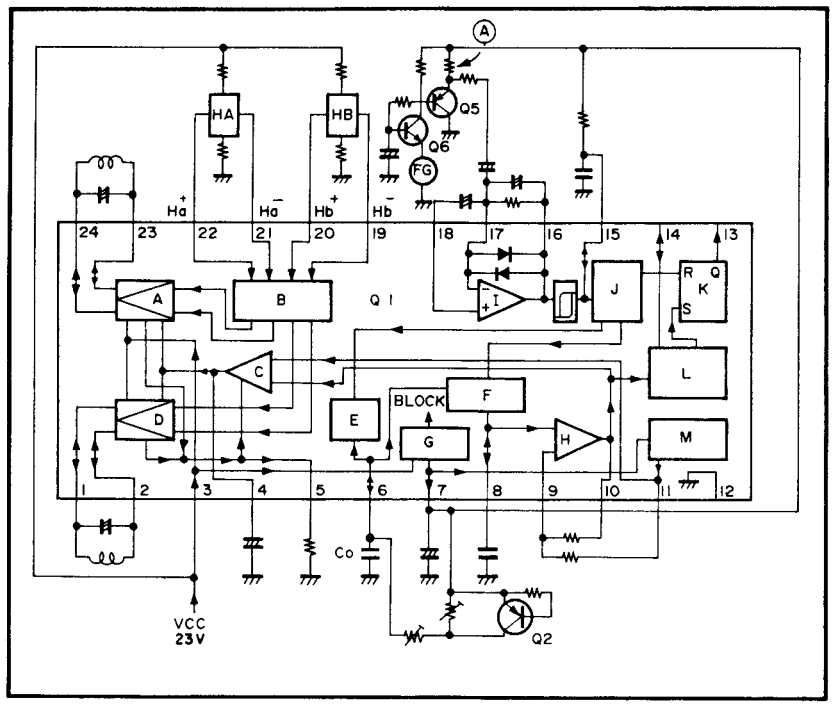
SPEED Selector Switch
Set this switch to the rotation speed of the record which you intend to play.
On [45] — For 45 rpm records
On [33] — For 33-1/3 rpm records

START/STOP switch
Press to start auto play mode, and to stop play.

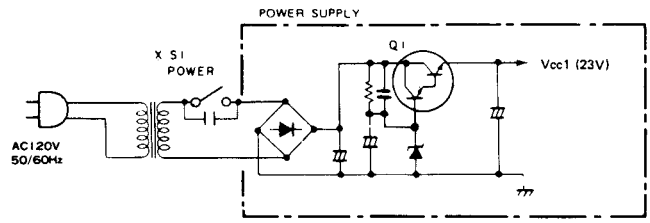
ARM ELEVATION Switch
- Use to perform manual play.
- Use to temporarily stop playing.
- Use to change tracks in the middle of play.
  When changed, the tone arm moves up or down.
  On [UP] position — To elevate the tone arm. (The stylus is lifted off the record.)
  On [DOWN] position — To lower the tone arm. (The stylus is lowered onto the record.)

3. BLOCK DIAGRAM

PHONO MOTOR CIRCUIT



A : DRIVING AMP
B : HALL－AMP
C : V－I CONVERTER
D : DRIVING AMP
E : RESET CIRCUIT
F : SAMPLE & HOLD CIRCUIT
G : VOLTAGE REGULATOR
H : BUFFER AMP
I : FG AMP
J : TIMING CIRCUIT
K : PHASE COMPARATOR
L : LOCK INDICATOR
M : 1/2 VCC2 CIRCUIT



*S1 (microswitch) is at the mechanism section.

4. CIRCUIT DESCRIPTION

4.1 Phono Motor Circuit

The phono motor of this player uses magnetism along the outside edge of the drive magnet to determine its rpm value. (Formerly, a separate magnet was needed in addition to the drive magnet.)

This motor uses a PA2017 as its control drive IC. Also, since this motor is brushless and coreless, the position of the rotor magnet is detected by two Hall elements HA and HB, which make the motor turn by switching the current to the drive coil electronically. When voltage is applied to the Hall elements HA and HB, a voltage differential is created in the output interval by the magnetic field of the approaching rotor. The Hall elements HA and HB are also attached 90° electrically out of phase so their output signals have a 90° phase difference. (See Fig. 4-1)

After the output voltage from the Hall elements have been amplified by the PA2017 Hall amplifier, it enters a position signal composite circuit (See Fig. 4-3). The output from the position signal composite circuit is then input into the respective drive amplifiers. The coil current at this time is as shown is figure 4-1 coils A and B. This current produces a magnetic field in the drive coil, and the polarity of the coil and the polarity of the rotor attract and repel each other causing the motor to start turning.

When the motor starts turning, the signal (approximately 0.5mV p-p) produced by a frequency generator (FG) in the motor rotatinon unit, is amplified to about 0.3V p-p by an FG amplifier (Q5, Q6) and is input into the FG amplifier (input pin 17) inside PA2017. Possible frequencies at this point are 55.55 Hz for 33 rpm and 75 Hz for 45 rpm.

The signal then undergoes waveform shaping in the Schmitt transistor, and is then input into the reset circuit, the sample and hold circuit and finally the timing circuit for a timing pulse for the phase comparison circuit. In the Signals are input into the reset circuit and the sample and hold circuit, and undergo F — V conversion (pin 8). The signals are then amplified by the buffer amplifier and then input into the V — I conversion circuit. The V — I conversion circuit controls the current that flows into the drive circuit based on the difference between the output of the buffer amplifier and the referance voltage (1/2V CC2).

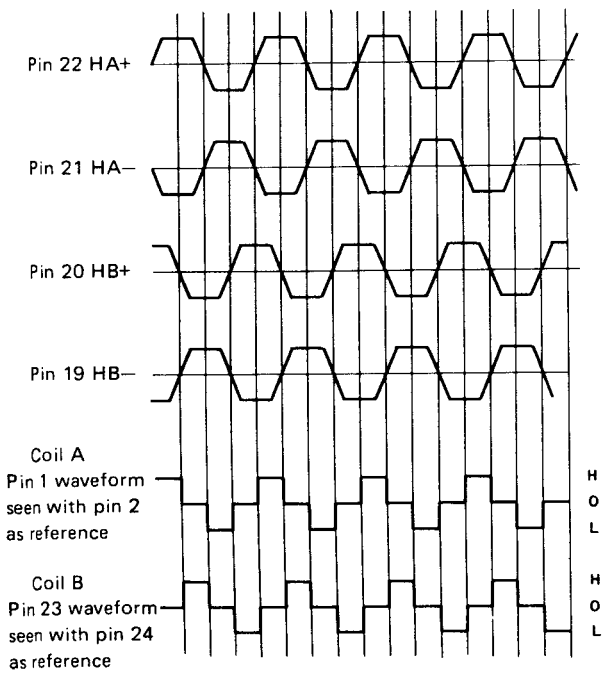


Fig. 4-1 Hall Elements and Coil Terminal Waveforms

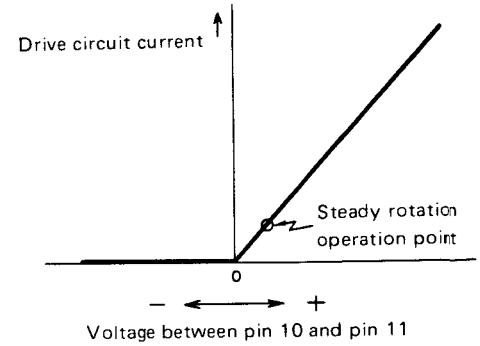


Fig. 4-2 V — I Conversion + Drive Circuit I/O Characteristics

When the motor has just begun truning, the F — V conversion voltage will be higher than the reference voltage, so current will flow into the drive coil, and the motor will speed up. Gradually, the motor will return to a constant rotation speed.

When the motor spins faster than regulation speed, both the P — V and F — V conversion voltage become lower than the reference voltage. This causes the current to stop flowing in the drive circuit and the rpms decrease because of a loss of torque.

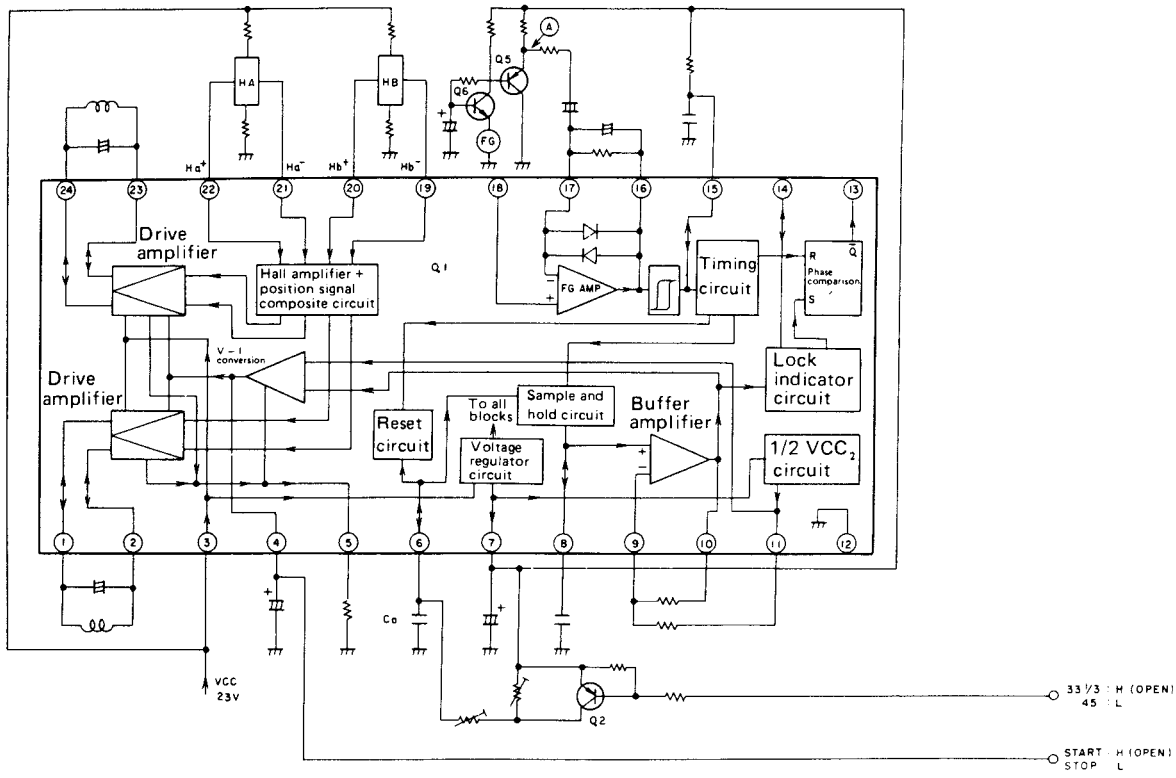


Fig. 4-3 Phono Motor Circuit

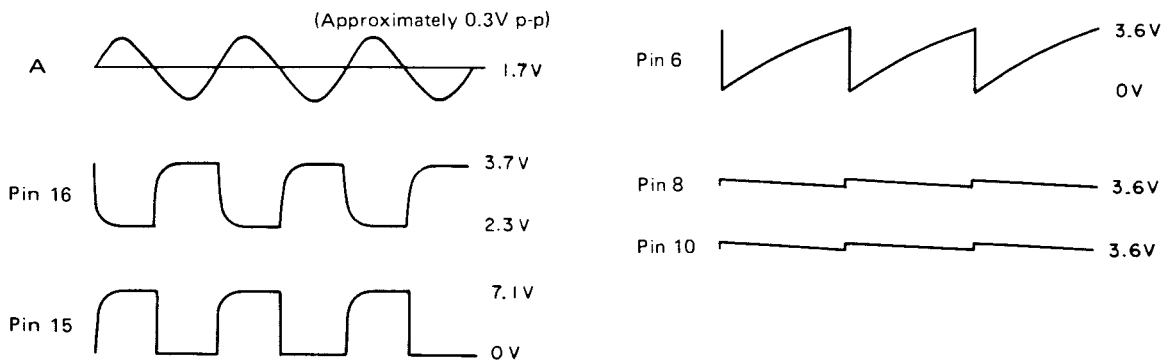


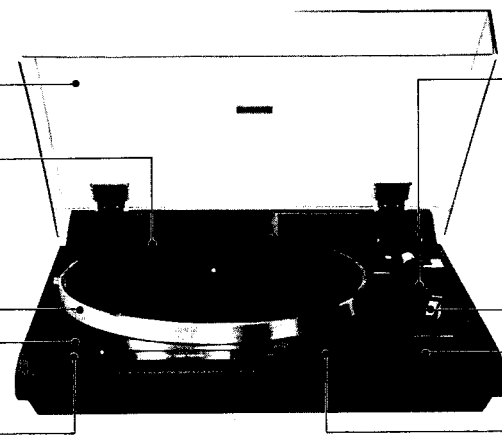
Fig. 4-4 Phono Motor Circuit Waveforms

5. PARTS LOCATION

NOTES:

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Front View



★★ Dust cover PNV-061

Rubber sheet assembly PEA-066

Turntable platter PNR-219

Panel PNY-339

SP button PAC-231

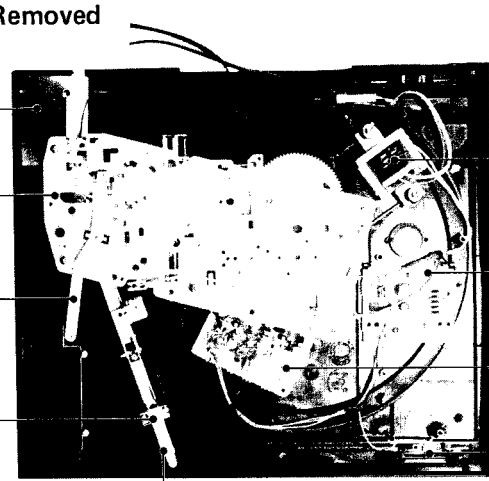
★ Tonearm assembly PPD-681

Cartridge (Without stylus) PXV-973

S/S button PAC-230

EV button PAC-232

Bottom View with Under BASE Removed



Shield plate PNM-024

⚠ Sub-panel assembly

Start lever unit PXV-036

★★ Push switch PSG-048

EV lever (A) PNC-311

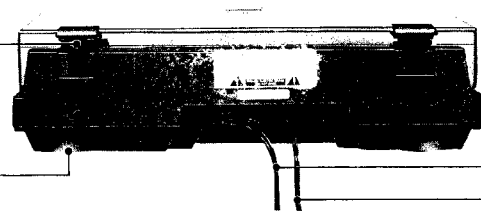
⚠ ★ Power transformer assembly PTX-072

⚠ Power supply assembly PWR-084

Motor P.C. board assembly PWM-198

SP button PAC-231

Rear View



★ Hinge assembly PXB-321

Insulator PEB-251

PU cord assembly PXB-333

⚠ Power cord assembly PDF-2[illegible]

6. DISASSEMBLY

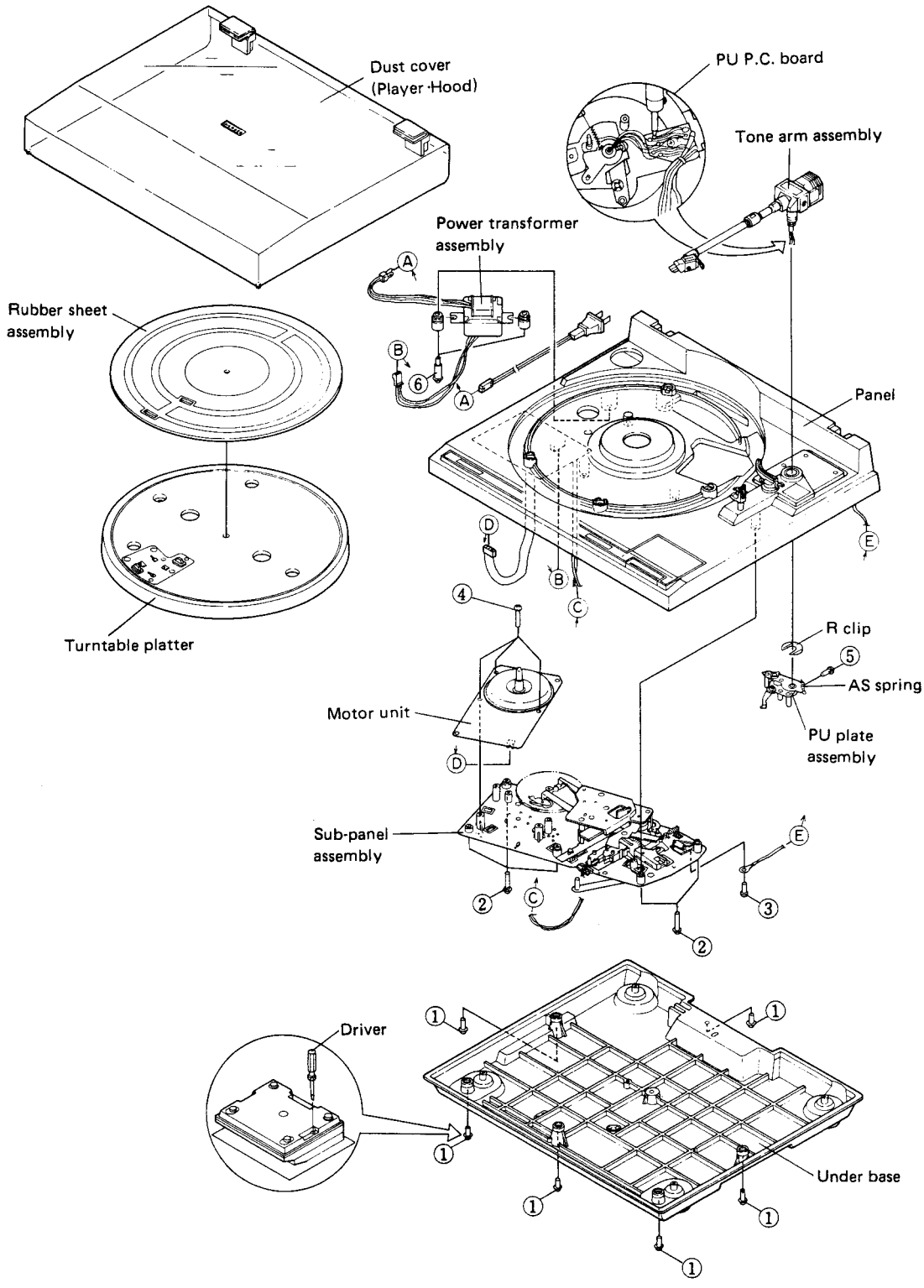


Fig. 6-1 Disassembly

- **Mechanism Assembly and Motor**

1. Turn on the turntable and free the mechanism.
2. Fasten the tone arm to the arm rest.
3. Remove the rubber sheet and turntable.
4. Close the player hood and turn the player upside down and place it on a soft cloth so that the player hood is not damaged.
5. Remove the six screws ① , and remove the under base.
6. Remove five screws ② and one screw ③
7. Disconnect connectors Ⓐ and Ⓑ
   The mechanism assembly can be removed from the panel.
8. Remove the three screws ④ , and remove the motor.

See pages 26 to 28 for the parts installation and assembly precautions.

- **Tone Arm**

1. Remove the mechanism assembly from the panel.
2. Using a soldering iron, disconnect the PU lead wires (arm lead wires) from the PU P.C. board.
3. Remove the PU plate assembly AS spring.
4. Remove the one screw ⑤ , and remove the PU plate assembly from the tone arm.
5. Remove the R clip.
6. Turn the player onto its side, remove the arm rest clamp, and remove the tone arm from the panel.

- **Power Transformer Assembly**

Remove the two screws ⑥ .

7. EXPLODED VIEW AND PARTS LIST

7.1 EXTERIOR

NOTES:

- *Parts without part number cannot be supplied.*
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  ★★ GENERALLY MOVES FASTER THAN ★
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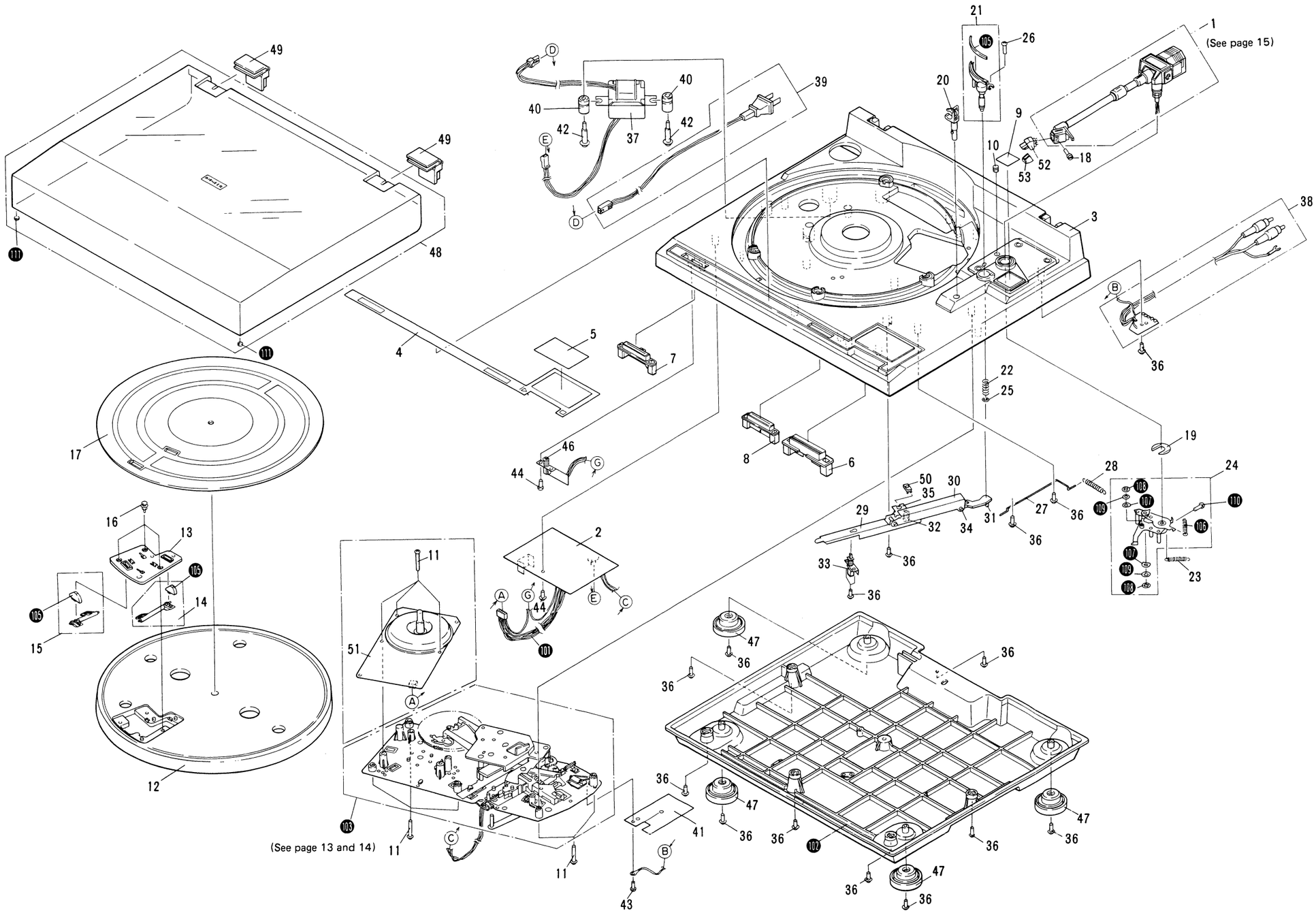
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Parts List of Exterior

Mark	No.	Part No.	Description
★	1.	PPD-681	Tonearm assembly
⚠	2.	PWR-084	Power supply assembly
	3.	PNY-339	Panel
	4.	PAM-218	Screen
	5.	PAN-140	Panel board
	6.	PAC-230	S/S button
	7.	PAC-231	SP button
	8.	PAC-232	EV button
	9.	PAN-066	AS board
	10.	PEB-114	Rubber bush (KU only)
	11.	IPC30P290FMC	Screw
	12.	PNR-219	Turntable platter
	13.	PNY-059	Hook holder
	14.	PXV-037	Record detector unit
	15.	PXV-038	Size detector unit
	16.	PBM-011	Plastic rivet
	17.	PEA-066	Rubber sheet assembly
	18.	PBA-170	Cartridge mounting screw
	19.	PBK-059	R clip
	20.	PXB-332	Arm rest assembly
	21.	PXV-068	EV sheet unit
	22.	PBH-355	EV spring
	23.	PBH-425	AS spring
	24.	PXB-323	PU plate assembly
	25.	PBF-020	Washer
	26.	BPZ26P120FZK	Screw
	27.	PBH-421	S/S rod
	28.	PBH-356	Select lever spring
	29.	PNC-311	EV lever (A)
	30.	PNC-312	EV lever (B)
	31.	PNY-130	EV lever (C)
	32.	PBH-375	EV lever spring
★★	33.	PSG-048	Push switch (DUMMY)
	34.	PLB-210	EV lever shaft
	35.	TMZ30P120FMC	Screw
	36.	IPC30P100FMC	Screw
⚠ ★	37.	PTX-072	Power transformer assembly
	38.	PXB-333	PU cord assembly
⚠	39.	PDF-221	Power cord assembly
	40.	PEB-250	Damper rubber
	41.	PNM-024	Shield plate
	42.	PBA-144	Clamp screw
	43.	PSZ30P060FMC	Screw
	44.	PPZ30P080FMC	Screw
	45.		
★★	46.	PSG-050	Push switch (S2)
	47.	PEB-251	Insulator
★★	48.	PNV-061	Dust cover
★	49.	PXB-321	Hinge assembly
	50.	YU30FUC	Nut
★★	51.	PXM-142	Motor assembly
	52.	PXV-973	Cartridge (Without stylus)
	53.	PNX-972	Stylus cover
	54.	PDE-308	Connector assembly
	101.		Lead wire assembly
	102.		Under base
⚠	103.		Sub-panel assembly
	104.		
	105.		Rubber guard
	106.		PU plate spring
	107.		PU spring washer
	108.		Washer
	109.		Washer
	110.		Screw
	111.		Rubber foot

Exterior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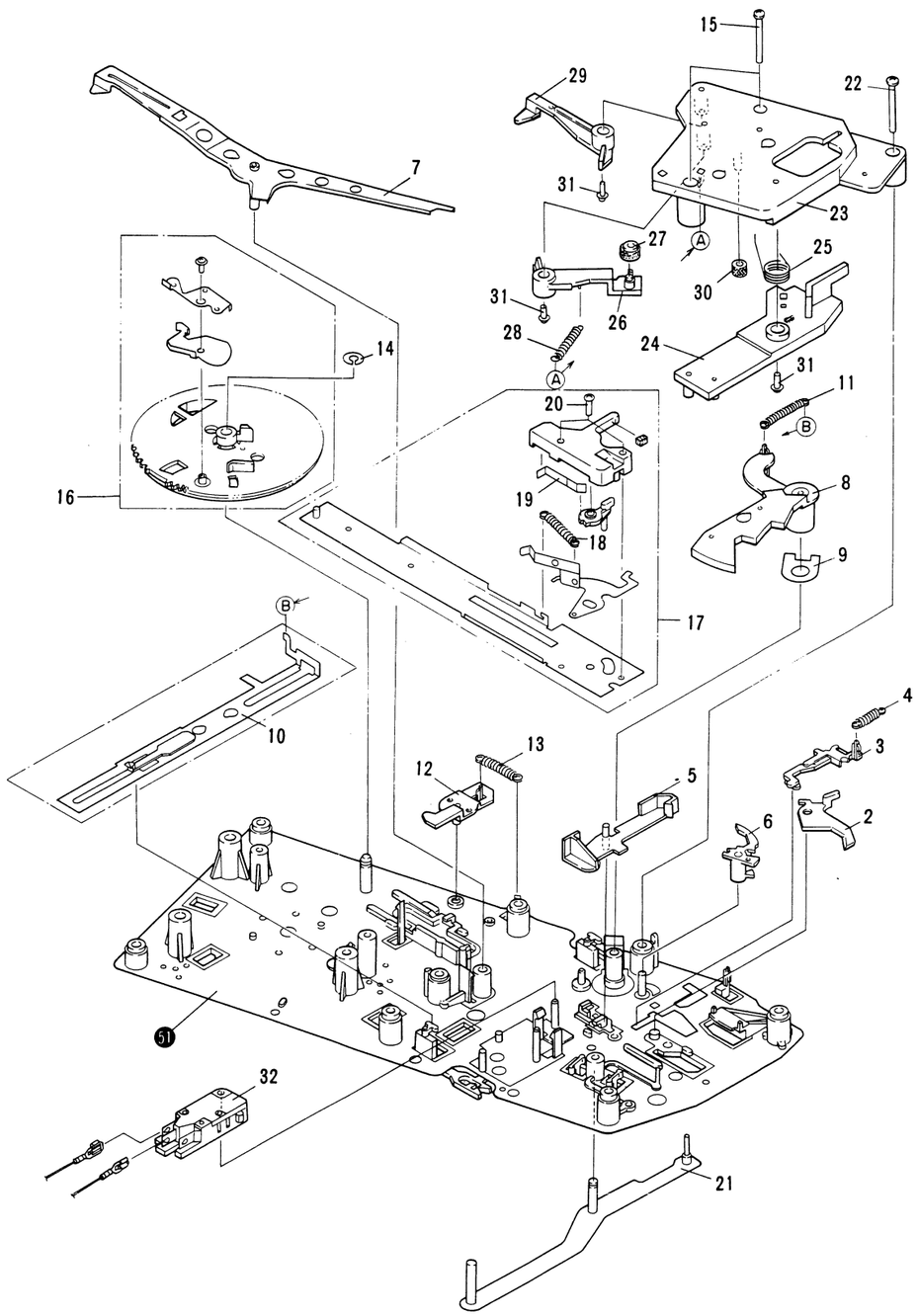
7.2 MECHANISM SECTION (SUB-PANEL ASSEMBLY)



NOTES:

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  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Parts List of Mechanism Section (Sub-Panel Assembly)

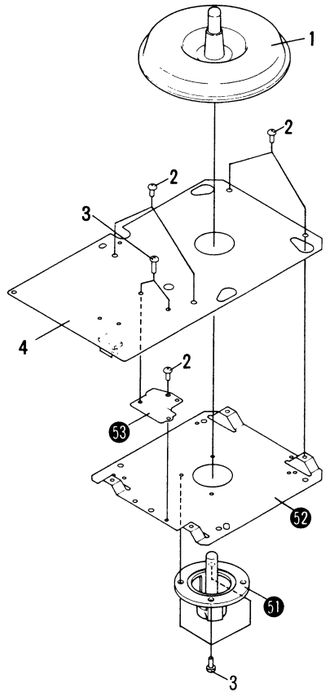
Mark	No.	Part No.	Description
	1.		. . . . .
	2.	PNX-028	Reset plate
	3.	PNY-140	Selector
	4.	PBH-394	Reset plate spring
	5.	PNX 030	Switch lever
★★	6.	PNY-141	Switch locker
	7.	PXT-446	Select lever unit
	8.	PNY-138	Index cam
	9.	PBK-039	Spring washer
	10.	PXV-060	Select lever unit
	11.	PBH-393	Select lever spring
	12.	PNY-139	Lock plate
	13.	PBH-392	Lock plate spring
	14.	PBF-018	Polyslider washer
	15.	PBA-172	Screw
	16.	PYY-164	Cam assembly
	17.	PXB-376	Drive board assembly
	18.	PBH-224	Start board spring
	19.	PBK-038	Click spring
	20.	PMZ26P100FMC	Screw (2.6 x 10)
	21.	PXV-036	Start lever unit
	22.	PBA-172	Screw
	23.	PNY-054	Stay
	24.	PNY-055	Hook guide
	25.	PBH-357	Hook guide spring
	26.	PNY-056	Click lever
	27.	PXV-044	Roller unit
	28.	PBH-358	Click lever spring
	29.	PNY-058	Timing lever
	30.	PED-027	Cushion
	31.	IPZ30P100FMC	Screw (3 x 10)
⚠ ★★	32.	PSF-023	Microswitch (POWER)

7.3 MOTOR ASSEMBLY (PXM-142)

Parts List of Motor Assembly

Mark	No.	Part No.	Description
	1.	PXV-107	Rotor unit
	2.	PSZ30P050FMC	Screw (3 x 5)
	3.	PBZ30P100FMC	Screw (3 x 10)
	4.	PWM-198	Motor P.C. board assembly
	51.		Spindle base unit
	52.		Base
	53.		Heat sink

Motor Assembly

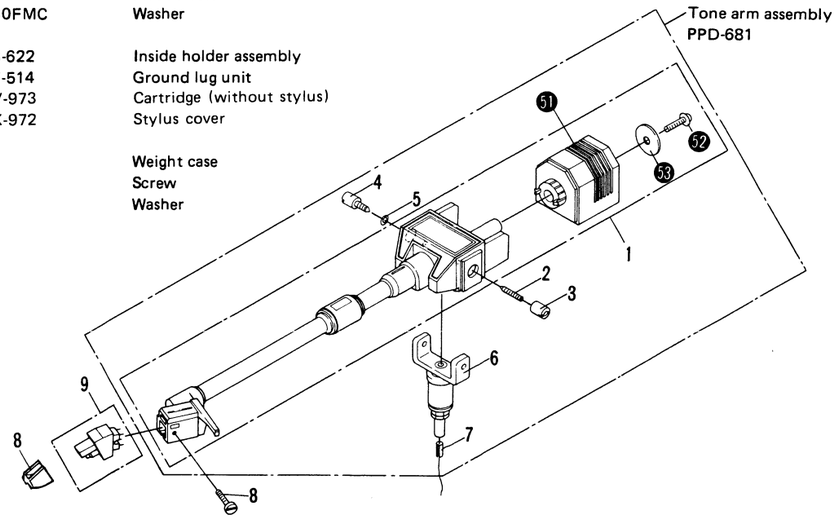


7.4 TONE ARM ASSEMBLY (PPD-681)

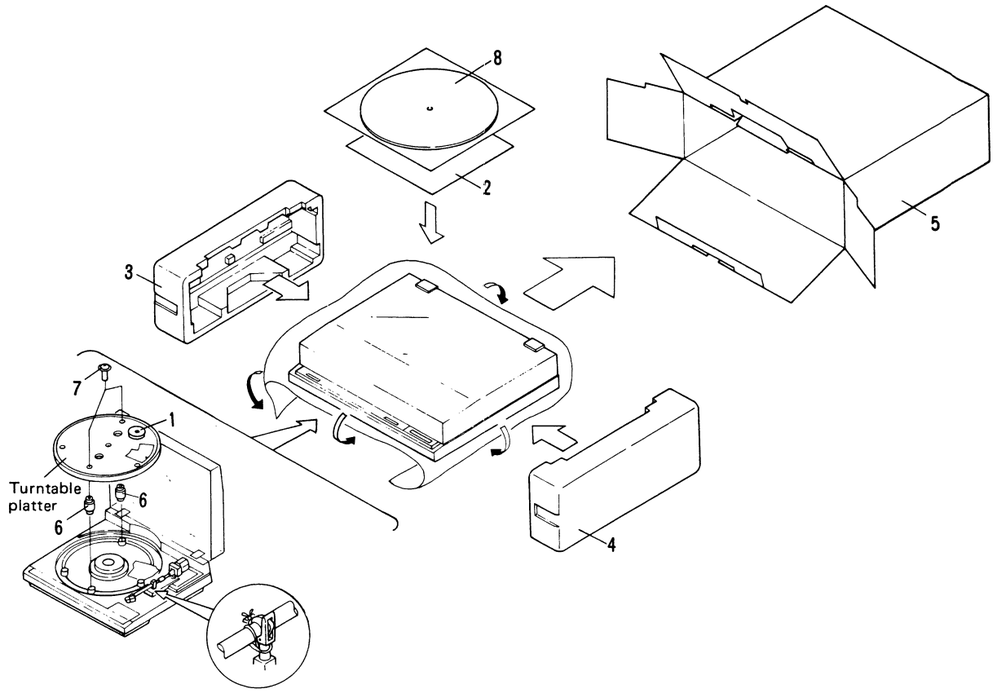
Parts List of Tonearm Section

Mark	No.	Part No.	Description
	1.	PXB-621	Pipe holder assembly
	2.	PLB-654	Pivot
	3.	PLB-655	Pivot lock nut
	4.	PLB-653	Pivot screw
	5.	WS30FMC	Washer
	6.	PXB-622	Inside holder assembly
	7.	PDF-514	Ground lug unit
	8.	PXV-973	Cartridge (without stylus)
	9.	PNX-972	Stylus cover
	51.		Weight case
	52.		Screw
	53.		Washer

Tone Arm Assembly



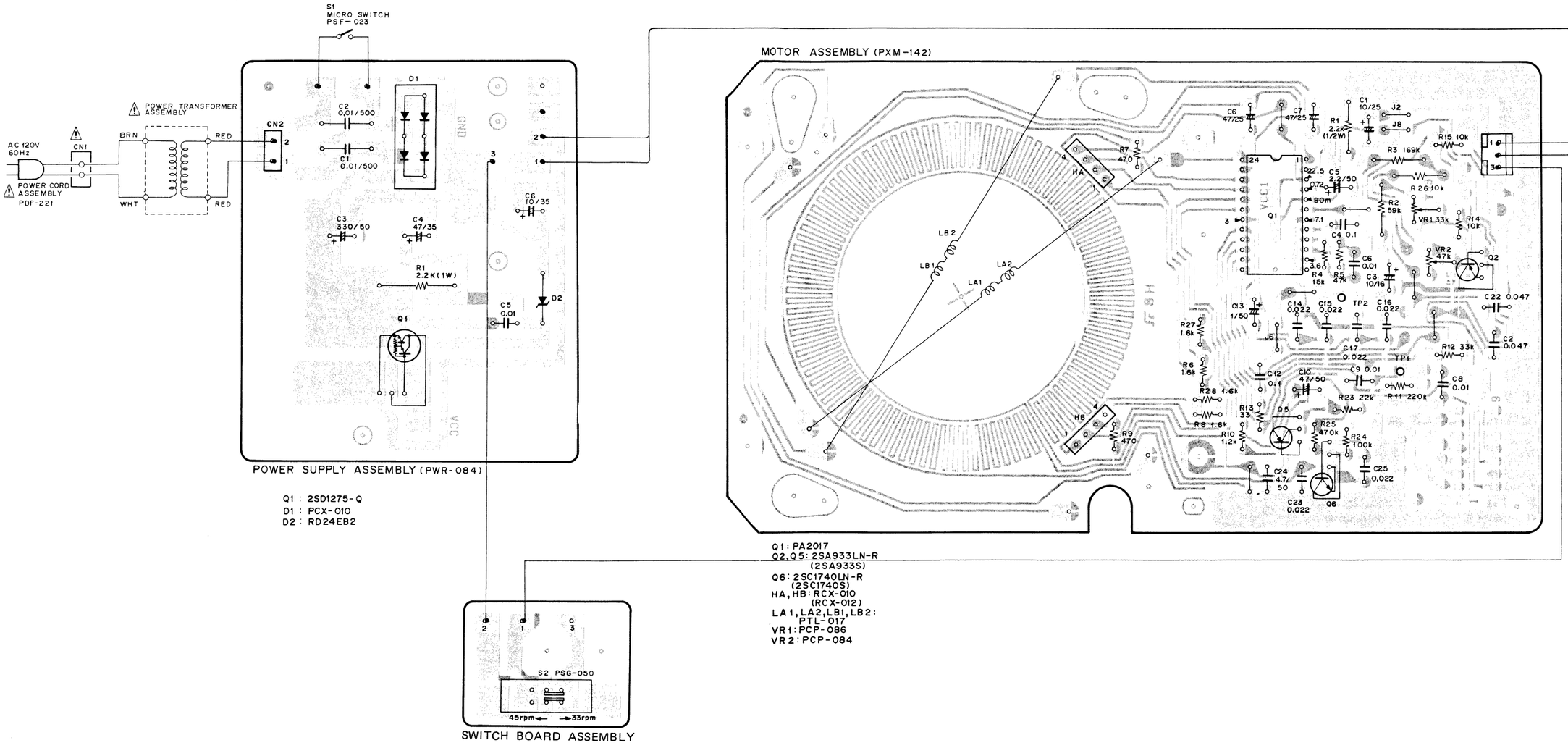
8. PACKING



Parts List of Packing

Mark	No.	Part No.	Description
	1.	N93-603	45 adaptor
	2.	PRB-320	Operating instructions (English)
	3.	PHA-173	Proctetor (L)
	4.	PHA-174	Protector (R)
	5.	PHH-383	Packing case
	6.	PNY-198	Turntable protector
	7.	PBA-178	Screw
	8.	PEA-066	Rubber sheet assembly

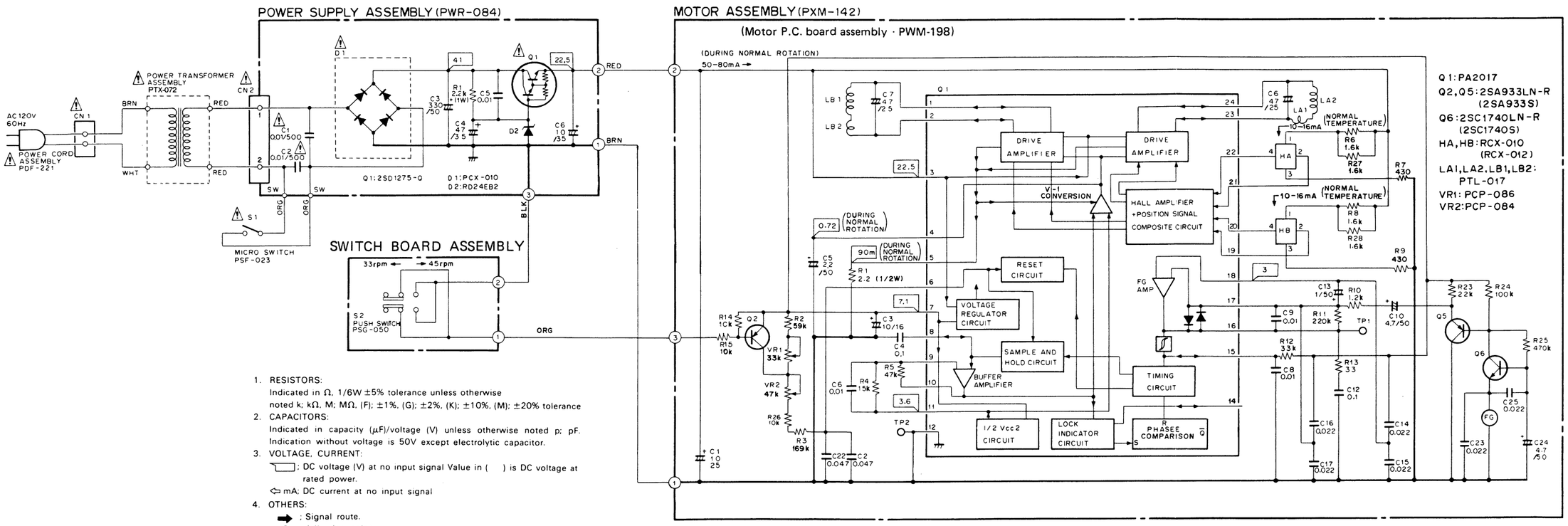
9. P.C. BOARDS CONNECTION DIAGRAM



Q1 : PA2017
Q2, Q5 : 2SA933LN-R
(2SA933S)
Q6 : 2SC1740LN-R
(2SC1740S)
HA, HB : RCX-010
(RCX-012)
LA1, LA2, LB1, LB2 :
PTL-017
VR1 : PCP-086
VR2 : PCP-084

10. SCHEMATIC DIAGRAM

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



1. RESISTORS:
   Indicated in Ω, 1/6W ±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE, CURRENT:
   ▭: DC voltage (V) at no input signal Value in ( ) is DC voltage at rated power.
   ⇦ mA; DC current at no input signal
4. OTHERS:
   ➡ : Signal route.
   ⊘ : Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ※ marked capacitors and resistors have parts unmbers.
   The underlined indicates the switch position.

   This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

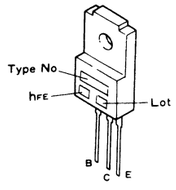
5. SWITCHES:

   S1: POWER ON-OFF
   S2: SPEED 33 1/3rpm - 45rpm

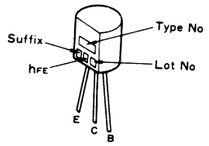
   THE UNDERLINED INDICATES THE SWITCH POSITION

External Appearance of Transistor and ICs

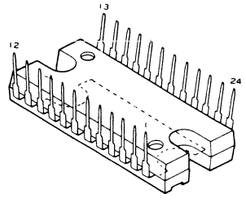
2SD1275



2SA933S
2SA933LN
2SC1740LN
2SC1740S



PA2017



11. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 × 10¹*	*561*	*RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN1/4SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Power supply assembly	PWR-084
	Switch board assembly	No supply
	Motor P.C. board assembly	PWM-198

OTHERS

Mark	Symbol & Description	Part No.
★★	Motor assembly	PXM-142
⚠ ★★ S1	Microswitch (POWER)	PSF-023
⚠ ★	Power transformer assembly	PTX-072
⚠	Power cord assembly	PDF-221
	PU cord assembly	PXB-345

Power Supply Assembly (PWR-084)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
⚠ ★★	Q1	2SD1275
⚠ ★	D1	PCX-010
★	D2	RD24EB2/EB1

CAPACITORS

Mark	Symbol & Description	Part No.
	C3	CEA331M50L
	C4	CEA470M35
	C6	CEA100M35
⚠	C1	CKDYE103P500
⚠	C2	CKDYE103P500
	C5	CKDYF103Z

RESISTOR

Mark	Symbol & Description	Part No.
	R1	RS1PMF222J

OTHERS

Mark	Symbol & Description	Part No.
	Screw (3 x 6)	PZZ30P060FMC

Motor Assembly (PXM-142)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q1	PA2017
★★	Q6	2SC1740LN (2SC1740S)
★★	Q2, Q5	2SA933LN (2SA933S)

CAPACITORS

Mark	Symbol & Description	Part No.
	C2	CQPA473J50
	C8, C9	CQMA103K50
	C4, C12	CKDYX104M25 (PCL-046)
	C22 Polyester capacitor	PCL-052
	C26	CKDYF103Z50
	C14, C15, C16, C17, C23, C25	CKDYF223Z50
	C1	CFA100M25
	C6, C7	CEANP470M25
	C3	CEA100M16
	C13	CEA010M50
	C5	CEA2R2M50
	C10, C24	CEA4R7M50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR1 Semi-fixed (33rpm) 33k(B)	PCB-086
★	VR2 Semi-fixed (45rpm) 47k(B)	PCP-084
	R26 10KΩ (1/4W)	PCN-005
	R2, R3	RN1/4PQ□□□□F
	R1, R4 ~ R15, R23 ~ R28	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Screw (3 x 5)	PSZ30P050FMC
	Screw (3 x 10)	PBZ30P100FMC

Switch Board Assembly

SWITCH

Mark	Symbol & Description	Part No.
★★	S2 Switch (SPEED)	PSG-050

12. ADJUSTMENT

12.1 MOTOR OPERATION ADJUSTMENT

1. Remove the underbase.
2. Connect the Ach of a dual trace oscilloscope to the circuit board unit, Q3 (PD0008) pin 15, and GND. Adjust the time axis so that 1 period of the output waveform is equal to 8 divisions in the 33 rpm mode. Fig. 12-2 (a).
3. Connect the Bch of a dual trace oscilloscope to Q1 (PA2017) pin 15, and GND. Adjust VR2 (45 rpm) so that the relation between the Ach and Bch waveforms in the 45 rpm mode is as shown in Fig. 12-2 (b).
4. Set the turntable to 33 rpm and adjust VR1 (33 rpm) until the relation between the Ach and Bch waveforms are as shown in Fig. 12-2 (c).
5. Always make motor operation adjustments starting with 45 rpm and ending with 33 rpm.

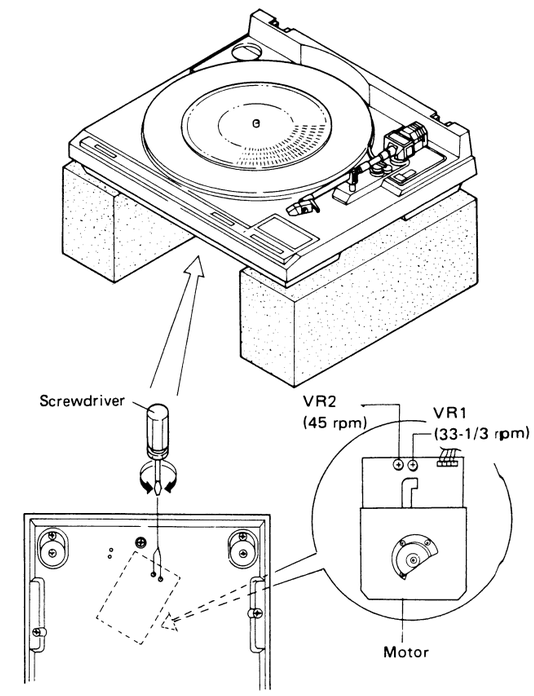


Fig. 12-1 Motor adjustment

12.2 Auto-Return Position Adjustment

When auto-return occurs too early or too late, make the following adjustments.

1. Check the stylus landing position. If the stylus does not land at the correct position, adjust the landing position.
2. Set the arm elevation switch to UP and turn the auto-return adjustment screw fully counter-clockwise.
3. Move the tone arm as far as it will go toward the inside.
4. When the auto-return adjustment screws is turned slowly clockwise, the tone arm will begin to move toward the inside.
5. Stop turning the adjustment screw at the point at which there is a space of 32 mm between the cartridge stylus and the center shaft.
6. After adjustment, check is auto-return is performed correctly and that the stylus landing position is correct.

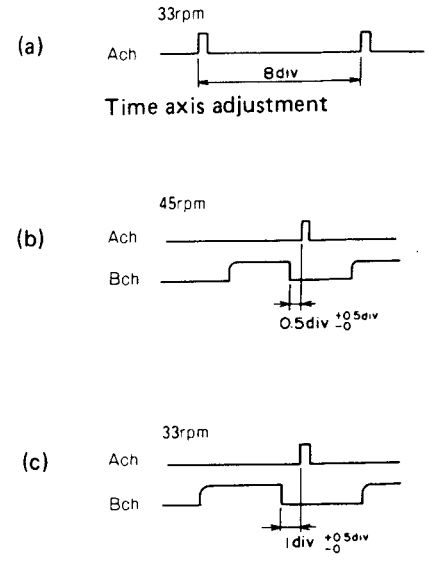


Fig. 12-2 Motor Operation Adjustment Waveforms

12.3 Arm Elevation Height Adjustment

1. Depress the arm elevation switch to lower the arm.
2. Adjust the screw under the turntable so the stylus is 11 mm above the panel. When the adjustment screw is turned counterclockwise, the stylus rises.
3. Depress the arm elevation switch to raise the tone arm.
4. Adjust the screws next to the arm elevation switch so the stylus is 25.5 mm above the panel.

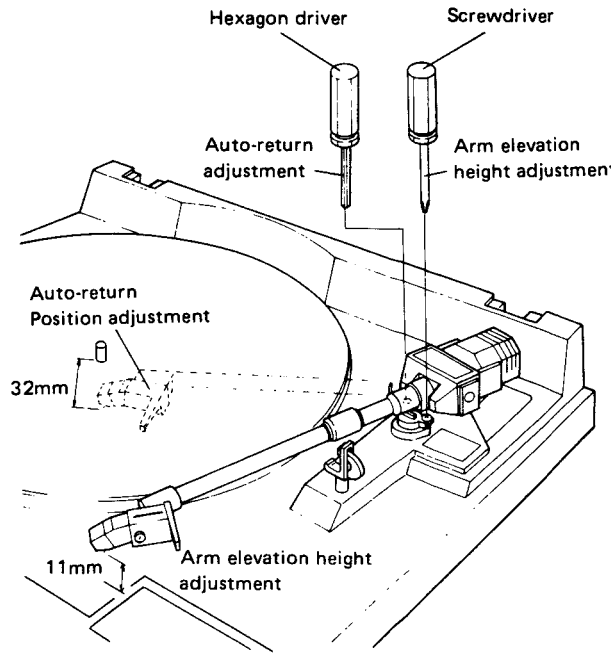


Fig. 12-3 Arm elevation height adjustment and auto-return adjustment

12. RÈGLAGE

12.1 RÉGLAGE DU FONCTIONNEMENT DU MOTEUR

1. Déposer la base inférieure.
2. Connecter le Ach de lóscilloscope à deux traces, au bloc de la plaquette de circuit, à la broche No. 15 de Q3 (PD0008), et GND. Régler l´axe de temps de telle maniére quúne période de la forme d´onde de sortie soit égale à 8 divisions en mode de 33 tours/minute. Fig. 12-2 (a).
3. Connecter le Bch de l´oscilloscope à deux traces à la broche No. 15 de Q1 (PA2017), et GND. Régler VR2 (45 tours/minute) de telle manière que le rapport entre les formes d´onde Ach et Bch en mode de 45 tours/minute soit celui indiqué par la Fig. 12-2 (b).
4. Régler le plateau sur 33 tours/minute et régler VR1 (33 tours/minute) jusqu'à ce que le rapport entre les formes d´onde de Ach et Bch soit celui indiqué par la Fig. 12-2 (c).
5. Toujours effectuer les réglages de fonctionnement du moteur en commençant avec le mode de 45 tours/minute et en terminant avec celui 33 tours/minute.

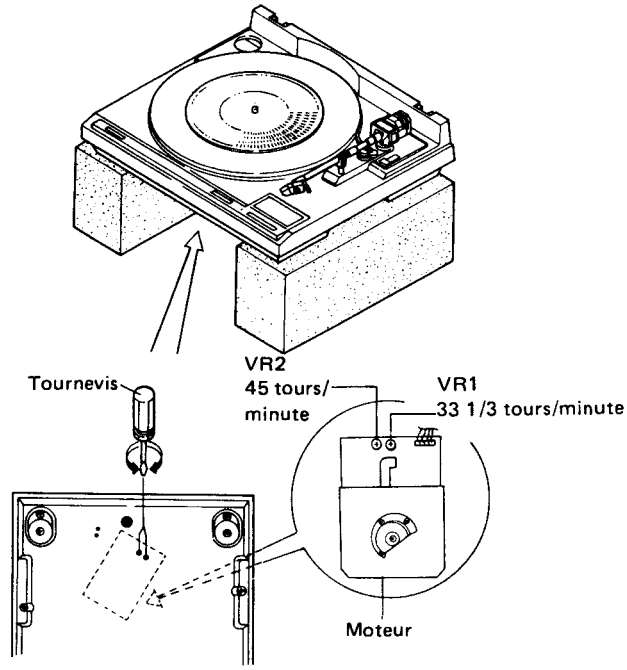


Fig. 12-1 Réglage du moteur

12.2 Réglage de la Position du Retour Automatique

Exécuter les réglages suivants au cas où le retour automatique s'effectue trop tôt ou trop tard.

1. Vérifier la position de descente de la pointe de lecture. Si celle-ci ne se pose pas sur la position correcte, régler la position de descente.
2. Placer l'interrupteur d'élévation du bras acoustique sur la position "UP" (vers le haut), et tourner la vis de réglage de retour automatique complètement dans le sens contraire des aiguilles d'une montre.
3. Déplacer le bras acoustique vers l'intérieur autant que possible.
4. Le bras acoustique se déplacera vers l'intérieur lorsque la vis de réglage du retour automatique est tournée lentement dans le sens des aiguilles d'une montre.
5. Interrompre la rotation de la vis de réglage sur le point où on obtient un écartement de 32 mm entre la points de la tête de lecture et l'axe central. (Fig. 12-2).
6. Après le réglage, vérifier si le retour automatique s'effectue correctement et si la position de descente de la pointe de lecture est appropriée.

12.3 Réglage de la Hauteur D´élévation du Bras Acoustique

1. Presser l'interrupteur d'élévation du bras acoustique pour abaisser le bras acoustique.

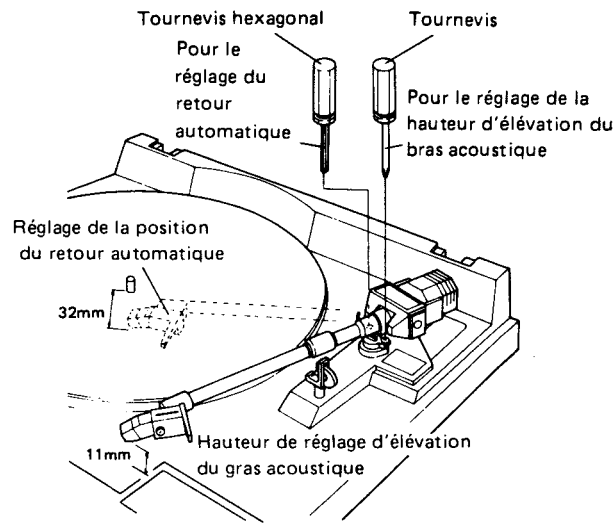


Fig. 12-2 Réglages de la hauteur d'élévation du bras acoustique et du retour automatique

2. Régler la vis en dessous de la platine de lecture de telle manière que la hauteur de la pointe de lecture soit de 11 mm au-dessus du panneau. La pointe de lecture se lève lorsque l'on tourne la vis de réglage dans le sens contraire des aiguilles d'une montre.
3. Presser l'interrupteur d'élévation du bras acoustique pour soulever le bras acoustique.
4. Régler les vis du côté de l'interrupteur d'élévation du bras acoustique de telle manière que la hauteur de la pointe de lecture soit de 25,5 mm au-dessus du panneau.

12. AJUSTE

12.1 AJUSTE DE LA OPERACIÓN DEL MOTOR

1. Sacar la sub-base.
2. Conectar el Ach del osciloscopio de trazas dobles a la unidad de tablero de circuito, al pasador No. 15 de Q3 (PD0008) y GND. Ajustar el eje de tiempo, de manera que la forma de onda de salida sea igual a 8 divisiones en el modo de 33 rpm. Figura 12-2 (a).
3. Conectar el Bch del osciloscopio de trazas dobles a Q1 (PA2017) pasador No. 15, y GND. Ajustar el VR2 (45 rpm) de manera que la relación entre las formas de onda de Ach y Bch en el modo de 45 rpm sea como se muestra en la Fig. 12-2 (b).
4. Fijar el disco giratorio a 33 rpm y ajustar el VR1 (33 rpm) hasta que la relación entre las formas de onda Ach y Bch sea como se muestra en la Fig. 12-2 (c).
5. Siempre efectúe los ajustes de la operación del motor comenzando por 45 rpm y terminando con 33 rpm.

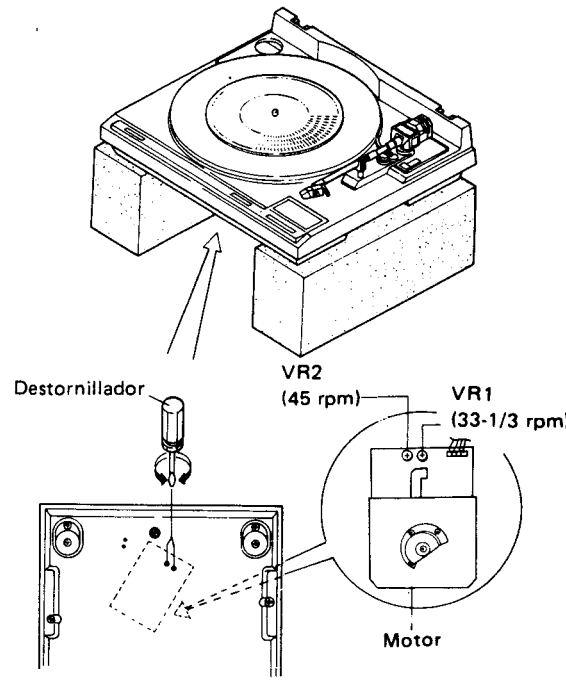


Fig. 12-1 Ajuste del motor

12.2 Ajuste de la Posición de Regreso Automático

Ejecutar los siguientes ajustes en caso de que el regreso automático ocurra muy temprano o muy tarde:

1. Verificar la posición de descanso de la aguja. Si la aguja no descansa en la posición correcta, ajustar la posición de descanso.
2. Colocar el interruptor de elevación del brazo en la posición "UP" (hacia arriba), y girar el tornillo de ajuste de regreso automático completamente en el sentido contrario al de las agujas del reloj.
3. Desplazar el brazo sonoro hacia dentro lo más lejos posible.
4. El brazo sonoro se desplazará hacia dentro cuando el tornillo de ajuste de regreso automático es girado despacio en el sentido de las agujas del reloj.
5. Interrumpir la rotación del tornillo de ajuste al punto en el cual hay un intervalo de 32 mm entre la aguja de cartucho y el eje central. (Fig. 12-2)
6. Después del ajuste, verificar si el regreso automático se ejecuta correctamente y si la posición de descanso de la aguja es apropiada.

12.3 Ajuste de la Altura de Elevación del Brazo Sonoro

1. Presionar el interruptor de elevación del brazo sonoro para bajar el brazo.

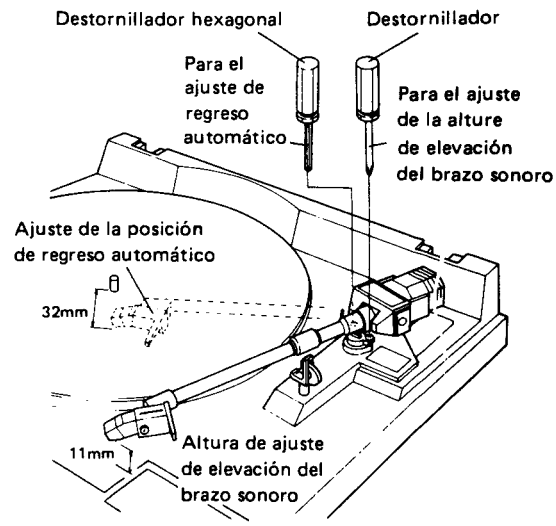

Destornillador hexagonal
Destornillador
Para el ajuste de regreso automático
Para el ajuste de la alture de elevación del brazo sonoro
Ajuste de la posición de regreso automático
32mm
11mm
Altura de ajuste de elevación del brazo sonoro

Fig. 12-2 Ajustes de la altura de elevación del brazo sonoro y de regreso automático;

2. Ajustar el tornillo bajo el tocadiscos de modo que la altura de la aguja sea de 11 mm sobre el panel. La aguja se levanta cuando se gira el tornillo de ajuste en el sentido contrario al de las agujas del reloj.
3. Presionar el interruptor de elevación del brazo sonoro para levantar el brazo.
4. Ajustar los tornillos al lado del interruptor de elevación del brazo sonoro de modo que la altura de la aguja sea de 25.5 mm sobre el panel.

13. PRECAUTIONS FOR REASSEMBLY

If new parts have been used, follow these directions and precautions when reassembling a unit after completing repairs. Be sure to lubricate as required, make no mistakes when attaching parts; and avoid all other careless mistakes that may be the cause of trouble later on.

13.1 AREAS THAT REQUIRE LUBRICATION

NOTE:
Types of lubricants and areas where they are used are listed in table 1.

Table 1

Type of Oil	Areas used
Silicon Oil #50000	raising shaft
GYA-008	all other areas

Lubrication points are specified for oils other than GYA-008. Never use a different type of oil.

- **Cam Section**

Apply grease to the heart-shaped grooved section (rear side of the cam) and lock plate sliding section in order to minimize wear on the sliding section and the burden on the mechanism.

- **Driving Plate Assembly**

Decrease the burden on the mechanism and the wear on the sliding section.

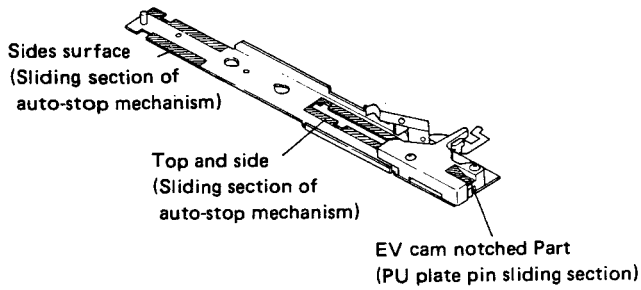


Fig. 13-1 Driving panel assembly section Switch Locker Section

- **Switch Locker Section**

Apply grease to the switch locker (opening) and sub-panel base sliding section to decrease the burden on the mechanism.

When applying grease to the opening (shaft hole), do not apply any grease 2 ~ 3mm from the bottom surface. If grease is applied 2~3mm within the bottom surface, it may come out the bottom and go between the switch lever and sub-panel base causing the switch lever to operate ineffectively.

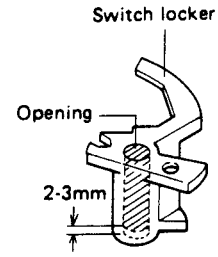


Fig. 13-2 Switch locker section

- **Selector Section**

Apply grease to the surface of the sub-panel base of the selector sliding section to decrease the burden on the mechanism and wear on the sliding section.

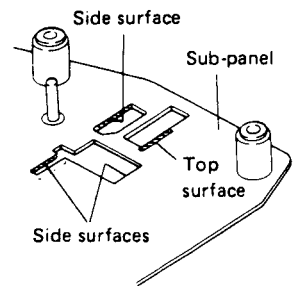


Fig. 13-3 Selector section

- **Reset Plate Section**

Apply grease to the sub-panel base (shaft) and sliding section of the reset plate to decrease the burden on the mechanism.

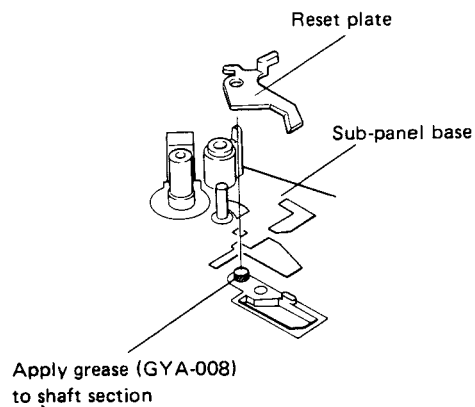


Fig. 13-4 Reset plate section

- **Index Cam Section**

Apply grease to the index cam and lower surface of the hooked section to decrease the burden on the mechanism.

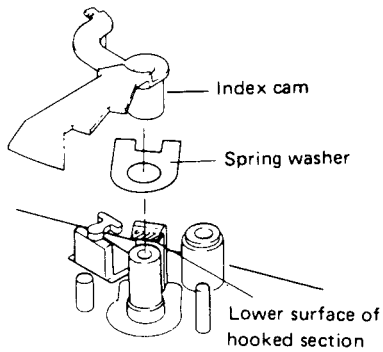


Fig. 13-5 Index cam section

- **EV Sheet Section**

Apply oil to the raising shaft and sliding section of the bearing to assure stability in the elevation lowering speed.

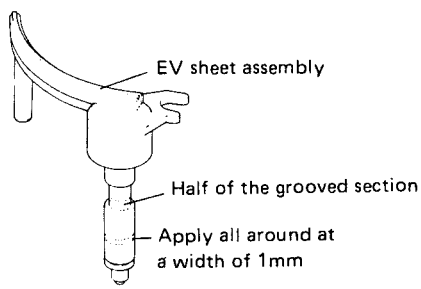


Fig. 13-6 EV sheet section

- **Cam section**

Coat the convex side of the cam with grease to prevent cam and timing lever contact section wear.

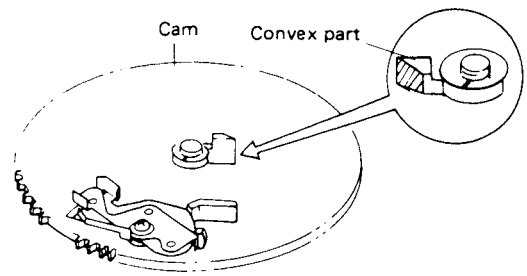


Fig. 13-7 Cam section

13.2 PRECAUTIONS FOR ATTACHMENT OF PARTS AND REASSEMBLY

- **Reset Plate SP Attachment**

As shown in Fig. 13-8, the reset plate SP hook is attached by putting the open section on the sub-panel base side.

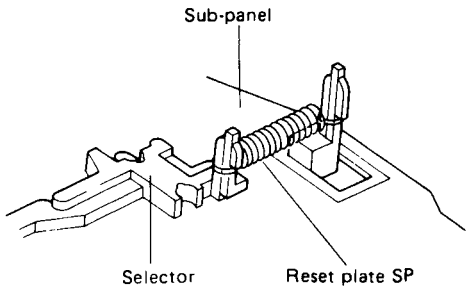


Fig. 13-8 Reset plate SP attachment

- **Cam Assembly Attachment**

The cam assembly is attached by letting the lock plate go in the direction Ⓐ as shown in Fig. 13-9.

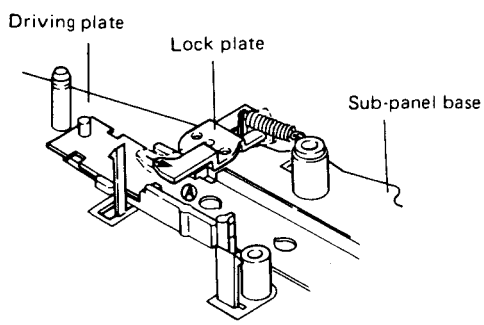


Fig. 13-9 Cam assembly attachment

- **Motor Attachment**

When installing the motor, set the cam in the mechanism stop location and verify that the starting plate section Ⓑ does not protrude beyond surface Ⓐ of the cam. If the motor is attached with the starting plate section Ⓑ protruding, the starting plate may be deformed, the motor pinion gear may be scratched, and the return function may be damaged.

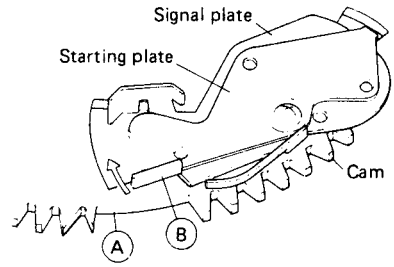


Fig. 13-10 Motor attachment

- **Start Lever Unit Attachment**

Attach the shaft section of the start lever unit as shown in Fig. 13-11 so that it comes between the reset plate and start plate.

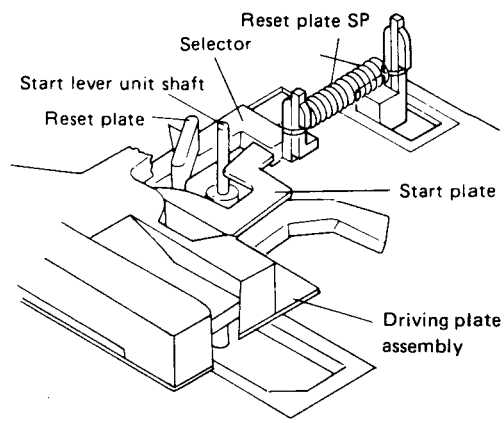


Fig. 13-11 Start lever unit attachment

14. FOR KC, R AND R/G TYPES

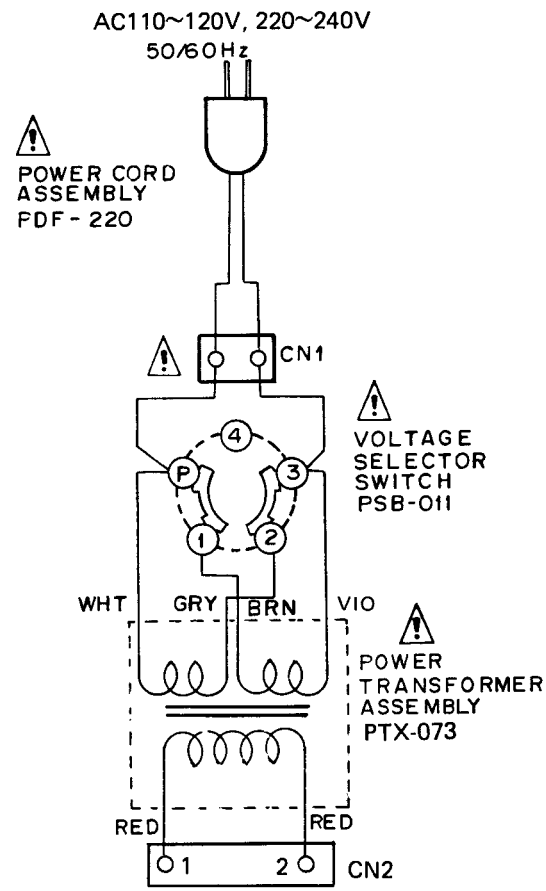
NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

PL-670 (BK)/KC, R and R/G types are the same as the PL-670 (BK)/KU type except for following sections.

Mark	Symbol & Description	Part No.				Remarks
		PL-670(BK)/KU	PL-670(BK)/KC	PL-670(BK)/R	PL-670(BK)/R/G	
	Panel	PNY-339	PNY-339	PNY-370	PNY-370	
⚠ ★	Power transformer assembly	PTX-072	PTX-072	PTX-073	PTX-073	
	PU cord assembly	PXB-345	PXB-333	PXB-333	PXB-333	
⚠	Power cord assembly	PDF-221	PDF-221	PDF-220	PDF-220	
⚠ ★★	Line voltage selector	. . .	. . .	PSB-011	PSB-011	
	Rubber bush	REB-114	. . .	. . .	. . .	
	Packing case	PHG1004	PHG1004	PHH-384	PHH-384	

Power Supply Circuit for R and R/G Types



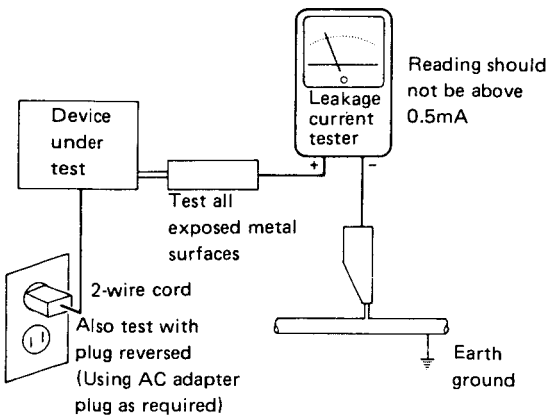
SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service tecnician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.